# MEASURING THE EFFECTS OF COMBAT IN CITIES PHASE II (Part 1)

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# Introduction

- This study is focused on the impact of urban terrain on division-level engagements
- Phase I covered urban operations in France & Germany (ETO) in 1944
- Phase II (part 1) covers urban operations in the three battles for Kharkov on the Eastern Front in 1943
- Phase II (part 2) is supposed to look at the impact of urban area on army-level operations.

# Study Concept

- Compare results in urban areas with comparable non-urban area
- Phase I included:

| **Urban/Conurban engagements:** | **Number** |
|---|---|
| Channel & Brittany Ports (June-September 1944) | 24 |
| Liberation of Paris (August 1944) | 1 |
| Aachen (October 1944) | 21 |
| | --- |
| | 46 |

**versus:**

| **Non-urban engagements:** | **Number** |
|---|---|
| Channel & Brittany Ports | 12 |
| Normandy & Breakout and Pursuit (June-Sep 1944) | 9 |
| Westwall and Lorraine Engagements | 11 |
| Aachen (Westwall) Engagements | 2 |
| Ardennes Engagements (Dec 1944—Jan 1945) | 57 |
| | --- |
| | 91 |

# Phase II Included:

| Urban/Conurban engagements: | Number |
|---|---|
| Kharkov (February 1943) | 11 |
| Kharkov (March 1943) | 28 |
| Kharkov (August 1943) | 12 |
| | ---- |
| | 51 |

**versus**

| Nonurban Engagements: | Number |
|---|---|
| Battle of Kursk (July 1943) | 65 |

# Research

- Engagements chosen so as to minimize cost by building off existing TDI work.
- Kharkov was chosen (over Stalingrad) because:

  1. We had already collected relevant nonurban engagements that we could compare them to.
  2. Kharkov was actually the largest city fought over on the Eastern Front prior to 1945.
  3. It was fought over three times in one year, giving a range of differing operational conditions.
  4. In two cases the Soviets were the attackers, and in one case the Germans were the attackers.
  5. No one else has ever analyzed these operations in depth.

- Almost all data gathered from unit records.
- Secondary sources were of little use.

# The data was used to make the following comparisons

- Force Ratios
- Mission Success (Outcome)
- Casualty Rates
- Armor Loss Rates
- Duration of Combat (Time)
- Advance Rates
- Linear Density

# Phase I Conclusions

1. Urban combat did not significantly influence the Mission Accomplishment (Outcome) of the engagements.
2. Urban combat may have influenced the casualty rate. If so, it appears that it resulted in a reduction of the attacker casualty rate and a more favorable casualty exchange ratio compared to nonurban warfare. Whether or not these differences are caused by the data selection or by the terrain differences is difficult to say, but regardless, there appears to be no basis to the claim that urban combat is significantly more intense with regards to casualties than is nonurban warfare.
3. The average advance rate in urban combat should be one-half to one-third that of nonurban combat.
4. Overall, there is little evidence that the presence of urban terrain results in a higher linear density of troops, although the data does seem to trend in that direction.
5. Overall, it appears that the loss of armor in urban terrain is the same as or less than that found in nonurban terrain, and in some cases is significantly lower.
6. Urban combat did not significantly influence the Force Ratio required to achieve success or effectively conduct combat operations.
7. Nothing could be determined from an analysis of the data regarding the Duration of Combat (Time) in urban versus nonurban terrain.

# We then repeated the analysis that was done in the first phase

**1. Comparisons (in aggregate):**

1. Comparing the engagements in aggregate (urban vs nonurban)
2. Comparing it depending on who is attacking (German or Soviet)
3. Urban vs Conurban
4. Urban vs Conurban by attacker
5. By Nonurban terrain type
6. Pared the data down to 52 urban versus 46 nonurban

**2. Detailed Analysis**

1. Effect of Urban Terrain on Outcome
2. Effect of Urban Terrain on Casualties
3. Effect of Urban Terrain on Advance Rates
4. Effect of Urban Terrain on Force Density
5. The Effect of Urban Terrain on Armor
6. The Effect of Urban Terrain on Force Ratios
7. Effect of Urban Terrain on the Duration of Combat

**3. Case studies**

1. February 1943
2. March 1943 (including logistics)
3. August 1943

# Result: Me too!

**Original Conclusions versus *new data***

1. Urban combat did not significantly influence the Mission Accomplishment (Outcome) of the engagements.

*This conclusion was further supported. The data does show a tendency for urban engagements not to generate penetrations*.

2. Urban combat may have influenced the casualty rate. If so, it appears that it resulted in a reduction of the attacker casualty rate and a more favorable casualty exchange ratio compared to nonurban warfare. Whether or not these differences are caused by the data selection or by the terrain differences is difficult to say, but regardless, there appears to be no basis to the claim that urban combat is significantly more intense with regards to casualties than is nonurban warfare.

*This conclusion was further supported. If urban combat influenced the casualty rate, it appears that it resulted in a reduction of the attacker casualty rate and a more favorable casualty exchange ratio compared to nonurban warfare. There still appears to be no basis to the claim that urban combat is significantly more intense with regards to casualties than is nonurban warfare*.

# Result: Me too! (cont.)

**Original Conclusions versus *new data***

3. The average advance rate in urban combat should be one-half to one-third that of nonurban combat.

*There was no strong evidence of a reduction in the advance rates in urban terrain in the Eastern Front data. TDI still stands by its original conclusion that the average advance rate in urban combat should be one-half to one-third that of nonurban combat*.

4. Overall, there is little evidence that the presence of urban terrain results in a higher linear density of troops, although the data does seem to trend in that direction.

*Again, there is little evidence that the presence of urban terrain results in a higher linear density of troops, but unlike the ETO data, the data did not show a tendency to trend in that direction*.

# Result: Me too! (cont.)

**Original Conclusions versus *new data***

5. Overall, it appears that the loss of armor in urban terrain is the same as or less than that found in nonurban terrain, and in some cases is significantly lower.

*This conclusion was further supported.*

6. Urban combat did not significantly influence the Force Ratio required to achieve success or effectively conduct combat operations.

*This conclusion was further supported.*

7. Nothing could be determined from an analysis of the data regarding the Duration of Combat (Time) in urban versus nonurban terrain

*Nothing could be determined from an analysis of the data regarding the Duration of Combat (Time) in urban versus nonurban terrain*.

# A look at some selected data

- Our report follows the exact same format as the Phase I report
- It systematically provides supporting data for each case from Kharkov and Kursk
- Its also provides the data generated in Phase I to compare on contrast

But for this briefing, as it was mostly “**me too**”, then we are just going to examine some highlights.

# Engagement Overview

| | Urban & Kharkov | Conurban | Nonurban Kursk |
|---|---|---|---|
| Number of Engagements | 51 | 65 | |
| Average Attacker Strength | 17,044 | 27,072 | |
| Average Defender Strength | 10,950 | 17,473 | |
| Average Force Ratio | 2.20 | 2.17 | |
| Weighted Force Ratio | 1.56 | 1.55 | |
| Percent Attacker Wins | 66.67 | 46.15 | |
| Average Battle Length (days) | 1.00 | 1.29 | |
| Average Attacker MBT Strength | 30 | 92 | |
| Average Defender MBT Strength | 15 | 47 | |
| Average Attacker Casualties | 214 | 411 | |
| Average Defender Casualties | 266 | 528 | |
| Average Attacker Casualties per day | 214 | 318 | |
| Average Defender Casualties per day | 266 | 408 | |
| Average Attacker Percent Loss per day | 1.15 | 1.38 | |
| Average Defender Percent Loss per day | 3.37 | 4.57 | |
| Weighted Attacker Percent Loss per day | 1.26 | 1.17 | |
| Weighted Defender Percent Loss per day | 2.43 | 2.34 | |
| Average Advance Rate (km/day) | 6.26 | 2.84 | |
| Attacker Linear Density (men/km) | 1,565.32 | 2,129.72 | |
| Attacker Weighted Linear Density | 1,219.86 | 1,522.22 | |

# Can’t Get Away From Human Factors

## Kursk - Nonurban

| | Germans Attacking | Soviets Attacking |
|---|---|---|
| Number of Engagements | 47 | 18 |
| Average Attacker Strength | 27,083 | 27,044 |
| Average Defender Strength | 16,922 | 18,910 |
| Average Force Ratio | 2.44 | 1.48 |
| Weighted Force Ratio | 1.60 | 1.43 |
| Percent Attacker Wins | 57.45 | 16.67 |
| Average Battle Length (days) | 1.34 | 1.17 |
| Average Attacker MBT Strength | 109 | 48 |
| Average Defender MBT Strength | 46 | 49 |
| Average Attacker Casualties | 276 | 761 |
| Average Defender Casualties | 682 | 126 |
| Average Attacker Casualties per day | 206 | 653 |
| Average Defender Casualties per day | 509 | 108 |
| Average Attacker Percent Loss per day | 1.00 | 2.39 |
| Average Defender Percent Loss per day | 6.05 | 0.71 |
| Weighted Attacker Percent Loss per day | 0.76 | 2.41 |
| Weighted Defender Percent Loss per day | 3.00 | 0.57 |
| Average Advance Rate (km/day) | 3.67 | 0.66 |
| Attacker Linear Density (men/km) | 2,355.21 | 1,540.94 |
| Attacker Weighted Linear Density | 1,601.94 | 1,346.94 |

# In Urban & Conurban Terrain (Kharkov)

| | Germans Attacking | Soviets Attacking |
|---|---|---|
| Number of Engagements | 28 | 23 |
| Average Attacker Strength | 17,080 | 17,001 |
| Average Defender Strength | 7,760 | 14,834 |
| Average Force Ratio | 2.97 | 1.26 |
| Weighted Force Ratio | 2.20 | 1.15 |
| Percent Attacker Wins | 89.29 | 39.13 |
| Average Battle Length (days) | 1.00 | 1.00 |
| Average Attacker MBT Strength | 46 | 10 |
| Average Defender MBT Strength | 6 | 26 |
| Average Attacker Casualties | 86 | 371 |
| Average Defender Casualties | 407 | 94 |
| Average Attacker Percent Loss per day | 0.49 | 1.95 |
| Average Defender Percent Loss per day | 5.62 | 0.63 |
| Weighted Attacker Percent Loss per day | 0.50 | 2.18 |
| Weighted Defender Percent Loss per day | 5.24 | 0.64 |
| Average Advance Rate (km/day) | 7.22 | 5.09 |
| Attacker Linear Density (men/km) | 1,801.07 | 1,278.32 |
| Attacker Weighted Linear Density | 1,477.87 | 1,005.22 |

# Human Factors: Mission Accomplishment

| | Kharkov (urban) | Kursk (nonurban, rolling) |
|---|---|---|
| **German Attack** | | |
| Number of Cases | 28 | 31 |
| Percent Success, win/loss | 89.29 | 77.42 |
| Average Score, attacker | 6.89 | 6.65 |
| Average Score, defender | 3.89 | 3.71 |
| Lowest Force Ratio | 1.01 | 0.63 |
| Highest Force Ratio | 9.42 | 11.67 |
| Average Force Ratio | 2.97 | 2.42 |
| Weighted Force Ratio | 2.20 | 1.64 |
| **Soviet Attack** | | |
| Number of Cases | 23 | 15 |
| Percent Success, win/loss | 39.13 | 20.00 |
| Average Score, attacker | 5.13 | 4.47 |
| Average Score, defender | 5.30 | 6.00 |
| Lowest Force Ratio | 0.40 | 0.51 |
| Highest Force Ratio | 2.31 | 2.89 |
| Average Force Ratio | 1.26 | 1.59 |
| Weighted Force Ratio | 1.15 | 1.49 |

# Human Factors: Casualty Effectiveness

| Kharkov Data | verage Force Ratio | Average Loss Ratio | Weighted Force Ratio | Weighted Loss Ratio |
|---|---|---|---|---|
| All German Attacks (28) | 2.97 | 0.53 | 2.20 | 0.21 |
| German Low-odds Attacks (13) 1.01 to 1.59-to-1 | 1.38 | 0.23 | 1.38 | 0.21 |
| All Soviet Attacks (23) | 1.26 | 4.86 | 1.15 | 3.93 |
| Soviet Low-odds Attacks (17) 0.40 to 1.53-to-1 | 0.96 | 3.28 | 0.86 | 2.47 |

| Kursk Data | Average Force Ratio | Average Loss Ratio | Weighted Force Ratio | Weighted Loss Ratio |
|---|---|---|---|---|
| All German Attacks (31) | 2.42 | 0.65 | 1.64 | 0.32 |
| German Low-odds Attacks (13) 0.63 to 1.42-to-1 | 1.04 | 0.58 | 1.06 | 0.25 |
| All Soviet Attacks (15) | 1.59 | 6.20 | 1.49 | 6.75 |
| Soviet Low-odds Attacks (10) 0.51 to 1.53-to-1 | 1.12 | 5.30 | 1.07 | 4.42 |

# Human Factors: Spatial Effectiveness

| | Kharkov | Kursk |
|---|---|---|
| German Attacks | | |
| Number of Cases | 28 | 31 |
| Percent Success | 89.29 | 77.42 |
| Range of data (km) | 0 to 22 | 0 to 18 |
| Average Advance Rate | 7.22 | 4.86 |
| Outcome IV-VI Cases | 25 | 19 |
| Range of data (km) | 0 to 22 | 1.4 to 18 |
| Average Advance Rate | 8.08 | 6.99 |
| | | |
| Soviet Attacks | | |
| Number of Cases | 23 | 15 |
| Percent Success | 39.13 | 20.00 |
| Range of data (km) | 0 to 22 | - 2.3 to 10.2 |
| Average Advance Rate | 5.09 | 0.90 |
| Outcome IV-VI Cases | 11 | 3 |
| Range of data | 2 to 22 | 2.7 to 10.2 |
| Average Advance Rate | 10.09 | 5.50 |

# Force Ratios vs Success

**ETO Data**

| Force Ratio | Result | Percent Failure | Cases |
|---|---|---|---|
| 0.55 to 1.01-to-1.00 | Attack Fails | 100% | 5 |
| 1.15 to 1.88-to-1.00 | Attack usually succeeds | 21% | 48 |
| 1.95 to 2.56-to-1.00 | Attack usually succeeds | 10% | 21 |
| 2.60-to-1.00 and higher | Attacker Advances | 0% | 42 |

**Germans attacking Soviets**

| Force Ratio | Result | Percent Failure | Cases |
|---|---|---|---|
| 0.63 to 1.06-to-1.00 | Attack usually succeeds | 20% | 5 |
| 1.18 to 1.87-to-1.00 | Attack usually succeeds | 6% | 17 |
| 1.91-to-1.00 and higher | Attacker Advances | 0% | 21 |

**Soviets attacking Germans**

| Force Ratio | Result | Percent Failure | Cases |
|---|---|---|---|
| 0.40 to 1.05-to-1.00 | Attack usually fails | 70% | 10 |
| 1.20 to 1.65-to-1.00 | Attack often fails | 50% | 11 |
| 1.91 to 2.89-to-1.00 | Attack sometimes fails | 44% | 9 |

# Effect of Urban Terrain on Casualties

| | I | II | III | IV | V | VI |
|---|---|---|---|---|---|---|
| **Germans Attacking, Kharkov** | | | | | | |
| Number of Cases | 2 | 1 | 0 | 21 | 4 | |
| Average percent attacker losses/day | 0.06 | 0.44 | | 0.54 | 0.46 | |
| Average percent defender losses/day | 1.04 | 4.02 | | 4.67 | 13.31 | |
| **Germans Attacking, Kursk** | | | | | | |
| Number of Cases | 4 | 6 | 2 | 9 | 7 | 3 |
| Average percent attacker losses/day | 0.23 | 0.56 | 0.68 | 1.30 | 1.22 | 0.75 |
| Average percent defender losses/day | 0.16 | 0.70 | 1.33 | 5.34 | 7.92 | 38.32 |
| **Soviets Attacking, Kharkov** | | | | | | |
| Number of Cases | | 3 | 9 | 10 | 1 | |
| Average percent attacker losses/day | | 1.81 | 2.11 | 1.76 | 2.88 | |
| Average percent defender losses/day | | 0.51 | 0.51 | 0.78 | 0.53 | |
| **Soviets Attacking, Kursk** | | | | | | |
| Number of Cases | | 5 | 7 | 3 | | |
| Average percent attacker losses/day | | 0.78 | 3.37 | 3.54 | | |
| Average percent defender losses/day | | 0.30 | 0.86 | 1.03 | | |

# Effect of Urban Terrain on Armor

| | No. of Cases | Average MBT Strength | Average Daily Tank Losses | Average Percent Losses | Weighted Percent Losses |
|---|---|---|---|---|---|
| Germans Attacking, Kharkov | | | | | |
| Attacker | 28 | 45.61 | 2.79 | 5.05 | 5.00 |
| Defender | 28 | 5.57 | 1.29 | 8.28 | 16.90 |
| Germans Attacking, Kursk | | | | | |
| Attacker | 31 | 148.16 | 19.03 | 7.83 | 9.70 |
| Defender | 31 | 67.81 | 20.16 | 12.31 | 17.69 |
| Soviets Attacking, Kharkov | | | | | |
| Attacker | 23 | 10.00 | 1.61 | 5.44 | 11.71 |
| Defender | 23 | 25.70 | 1.57 | 3.53 | 5.82 |
| Soviets Attacking, Kursk | | | | | |
| Attacker | 15 | 55.80 | 5.80 | 4.29 | 4.79 |
| Defender | 15 | 59.13 | 5.73 | 6.44 | 7.44 |

# The February Operations
## Summary, 12 – 20 February 1943

| Armor Losses Defender (A/D) | Date | Terrain | Force Ratio | Outcome | | Distance Advanced | Linear Density |
|---|---|---|---|---|---|---|---|
| GD | 12 Feb | RM/CU | 0.40 | Attacker Advances | 16 | 203.65 | 4/2 |
| GD | 13 Feb | RM/CU | 0.42 | Attacker Advances | 2 | 238.00 | 5/4 |
| GD | 14 Feb | RM/CU | 1.28 | Attacker Advances | 8 | 1138.30 | 1/4 |
| GD | 15 Feb | RM/U | 1.29 | Attacker Advances | 22 | 1143.35 | 7/2 |
| GD | 16 Feb | RM/CU | 0.43 | Failed Attack | 0 | 416.00 | 0/0 |
| GD | 17 Feb | RM/CU | 0.49 | Limited Attack | 1 | 475.86 | 0/0 |
| GD | 18 Feb | RM/CU | 0.57 | Failed Attack | 1 | 556.10 | 3/6 |
| GD | 19 Feb | RM/CU | 0.56 | Failed Attack | 1 | 548.71 | 3/0 |
| GD | 20 Feb | RM/CU | 0.67 | Attacker Advances | 4 | 680.20 | 1/3 |
| DR | 14 Feb | RM/CU | 2.31 | Defender Penetrated | 11 | 1848.56 | 8/7 |
| DR | 15 Feb | RM/U | 2.24 | Attacker Advances | 15 | 1793.68 | 5/7 |

# The March Operations
## Summary, 7 – 11 March

| Attacker | Date | Terrain | Force Ratio | Outcome | Distance Advanced | Armor Linear Density | Losses (A/D) |
|---|---|---|---|---|---|---|---|
| LSSAH | 7th | RM/CU | 1.41 | Attacker Advances | 8 | 805.91 | 6/0 |
| DR | 7th | RM/CU | 5.57 | Attacker Advances | 8 | 1,443.14 | 0/0 |
| 11th | 7th | RM/CU | 1.29 | Attacker Advances | 13 | 1,827.00 | 0/2 |
| | | | | | | | |
| T | 8th | RM/CU | 6.63 | Defender Penetrated | 14 | 2,346.88 | 0/0 |
| LSSAH | 8th | RM/CU | 2.65 | Defender Penetrated | 22 | 1,357.38 | 6/0 |
| DR | 8th | RM/CU | 4.44 | Attacker Advances | 14 | 2,236.67 | 0/0 |
| 11th | 8th | RM/CU | 1.01 | Attacker Advances | 4 | 1,370.25 | 0/2 |
| | | | | | | | |
| LSSAH | 9th | RM/CU | 1.39 | Defender Penetrated | 16 | 2,744.06 | 0/0 |
| DR | 9th | RM/CU | 1.35 | Attacker Advances | 9.4 | 2,865.14 | 3/0 |
| 11th | 9th | RM/CU | 1.38 | Attacker Advances | 2 | 913.50 | 18/2 |
| | | | | | | | |
| LSSAH | 10th | RM/CU | 2.67 | Defender Penetrated | 20 | 3,365.38 | 1/0 |
| DR | 10th | RM/CU | 1.35 | Attacker Advances | 2 | 1,818.18 | 4/2 |
| 11th | 10th | RM/CU | 1.06 | Attacker Advances | 2 | 913.50 | 6/2 |
| | | | | | | | |
| LSSAH | 11th | RM/CU | 1.55 | Attacker Advances | 6 | 544.25 | 19/2 |
| DR | 11th | RM/CU | 4.56 | Attacker Advances | 1.8 | 2,846.57 | 0/0 |
| 11th | 11th | RM/CU | 1.85 | Limited Attack | 0 | 913.50 | 0/1 |

# The March Operations (cont.)

## Summary, 12 – 15 March

| Attacker | Date | Terrain | Force Ratio | Outcome | Armor Losses (A/D) | Distance Advanced | Linear Density |
|---|---|---|---|---|---|---|---|
| LSSAH | 12th | Urban | 1.59 | Attacker Advances | 6 | 753.04 | 4/6 |
| DR | 12th | RM/CU | 4.90 | Attacker Advances | 2 | 2,204.56 | 0/0 |
| 11th | 12th | RM/CU | 1.93 | Limited Action | 0 | 913.50 | 0/0 |
| LSSAH | 13th | Urban | 1.52 | Attacker Advances | 2 | 1,560.36 | 0/6 |
| DR | 13th | RM/CU | 3.19 | Attacker Advances | 10 | 2,189.00 | 2/0 |
| 11th | 13th | RM/CU | 1.81 | Limited Action | 0 | 280.00 | 0/0 |
| LSSAH | 14th | Urban | 1.40 | Attacker Advances | 2.9 | 2,436.43 | 0/6 |
| DR | 14th | RM/CU | 4.97 | Attacker Advances | 5 | 1,960.30 | 4/0 |
| 11th | 14th | RM/CU | 6.47 | Attacker Advances | 20 | 1,838.46 | 1/0 |
| LSSAH | 15th | U/RM | 1.59 | Attacker Advances | 0 | 2,397.86 | 0/5 |
| DR | 15th | U/RM | 4.31 | Attacker Advances | 5 | 1,936.10 | 1/0 |
| 11th | 15th | RM/CU | 9.42 | Attacker Advances | 7 | 3,649.13 | 3/0 |

# The August Operations
## Summary, 18 – 23 August

**Armor**

| Defender | Date | Terrain | Force Ratio | Outcome | Distance Advanced | Linear Density | Losses (A/D) |
|---|---|---|---|---|---|---|---|
| 106th ID | 18th | RM/CU | 2.12 | Failed Attack | 1 | 2,106.44 | 0/0 |
| 106th ID | 19th | RM/CU | 2.08 | Failed Attack | 0 | 2,061.78 | 0/0 |
| 106th ID | 20th | RM/CU | 1.96 | Attacker Advances | 3 | 3,457.80 | 0/0 |
| 106th ID | 21st | RM/CU | 1.01 | Limited Attack | 0 | 888.20 | 0/0 |
| 106th ID | 22nd | RM/CU/U | 1.53 | Attacker Advances | 2 | 1,340.90 | 0/0 |
| 106th ID | 23rd | U/RM | 1.91 | Attacker Advances | 11 | 1,646.70 | 0/0 |
| | | | | | | | |
| 320th ID | 18th | RM/CU | 1.40 | Failed Attack | 1 | 1,289.64 | 0/0 |
| 320th ID | 19th | RM/U | 1.38 | Limited Attack | 0 | 1,267.27 | 0/0 |
| 320th ID | 20th | RM/U | 1.23 | Failed Attack | 1 | 1,242.91 | 0/1 |
| 320th ID | 21th | RM/U | 1.21 | Failed Attack | 0 | 1,223.64 | 0/0 |
| 320th ID | 22nd | RM/U | 1.20 | Failed Attack | 0 | 1,210.00 | 0/0 |
| 320th ID | 23th | U/RM | 1.20 | Attacker Advances | 17 | 2,623.60 | 0/0 |

# Additional Conclusions

- *The Kharkov data (although data was tested for only one case study) neither proves nor disproves that the urban environment uses more or less ammunition or fuel.*

- *The Kharkov data – since these operations required less than a day in two cases to secure the city and three days in the last case (March 1943) – provides little basis to conclude that urban operations are particularly time consuming.*

- *Advance rates during the Kharkov operations may have decreased, but that was not clearly established. They were certainly not out of line with the nonurban advance rates found during the Battle of Kursk. Still it does appear that in the March 1943 operations at Kharkov, the tempo of operations inside the city slowed while the tempo of operations outside the city was quicker, at least in the north.*

- *Furthermore, the three Kharkov cases very strongly support the hypothetical construct offered in Phase I of an urban area bounded by nonurban terrain.*

# Overall Observations

- First, creating a second body of data that covering an additional 51 urban engagements with which to test the conclusions developed in Phase I was very useful.
- Second, the fact that a second test using entirely different data either produced results supporting the existing conclusions or produced results that did not contradict the existing conclusions in many ways provides further validation for the work already done.
- Third, since all the data accumulated in Phase I was from the European Theater of Operations in World War II, using a data set from the Eastern Front in World War II showed that the results of the analysis were neither theater nor situational specific.
- Fourth, even though the capabilities of the opposing forces on the Eastern Front were evidently so different, the Kharkov data still provided results that supported – or at least did not contradict – the ETO data. This does give us some confidence that the conclusions of the Phase I study are more widely applicable to forces of similar capability.

# Overall Observations (cont.)

- The only sour note found in the Phase II study was the failure to confirm two major conclusions from Phase I relating to the difference between combat in urban and nonurban terrain. These were that:

  Casualty rates were lower in urban terrain and
  Rates of advance were lower in urban terrain.

  **Irrespective of these somewhat muddy and contradictory results, *The Dupuy Institute* stands by all of the conclusions made in the original Phase I study.**

# FUTURE DEVELOPMENT

**While *The Dupuy Institute* has already assembled the data for the Phase II, part 2 (Army Level) work and it can be done at a reasonably low cost, we believe that we are reaching a point of diminishing returns.**

- First, we really feel that we need to assemble a set of division-level engagements from the Battle of Stalingrad (August and November 1942)

- Second, we really believe that this study should look at battalion-level engagements as well.